

Pushing a Pull System

Transforming Marine Aviation Logistics

Douglas S. Steward

More is not always better, especially when it is the wrong stuff. Without improvements to existing logistics doctrine, combatant commanders cannot leverage the full potential of their aviation weapon systems.

by air, sea, or land. More is not always better, especially when it is the wrong stuff. Without improvements to existing logistics doctrine, combatant commanders cannot leverage the full potential of their aviation weapon systems. Additionally, with a greater presence of unmanned weapon systems, it makes sense that supporting logistics systems also place fewer personnel in harm's way.

The Marine Aviation Logistics Support Program is transforming to align with core doctrine changes and concepts such as distributed and prolonged operations, expeditionary maneuver warfare, and sea basing. The goal of the new design, MALSP II, is to provide logistics support to deployed and non-deployed core capable units at higher levels of performance while also decreasing the infrastructure and resource inventory. In January 2007, the Aviation Logistics Support Branch of Headquarters, Marine Corps, chartered the Aviation Logistics Transition Task Force and, in conjunction with Naval Air Systems Command, stood up the MALSP II Project Office to manage MALSP II improvements and program changes. Together, these activities form an architecture that identifies warfighting processes and relationships, relates systems to operational requirements, and describes standards and protocols. The architecture assists warfighters and program managers in communicating operational concepts to system developers, and provides an analytic basis for discussions and decisions.

The “As-Is” Design

The current MALSP design is a “push” system that relies on subjective forecasts and anecdotal evidence to support its forces. This just-in-case approach has resulted in the following logistics support characteristics:

- Days-of-usage depth
- Fixed-allowedance resource packages
- Heavy footprint
- Reactive system.

A graphic description of “as-is” designs exists in a Dec. 18, 2003, General Accounting Office report to Congress in which the GAO states that the “Department of Defense did not have adequate visibility over materiel that was transported to, within, and from the Operation Iraqi Freedom theater of operations” and that “distribution capability in

The Berlin Wall came down in 1989, and despite changes in how America fights wars, logisticians and planners continue to push forward the heavy footprint of the Cold War era. In a modern battlespace, combatant commanders want logistics support that is agile, flexible, proactive, and able to surge. This support must also be capable of rapid deployment

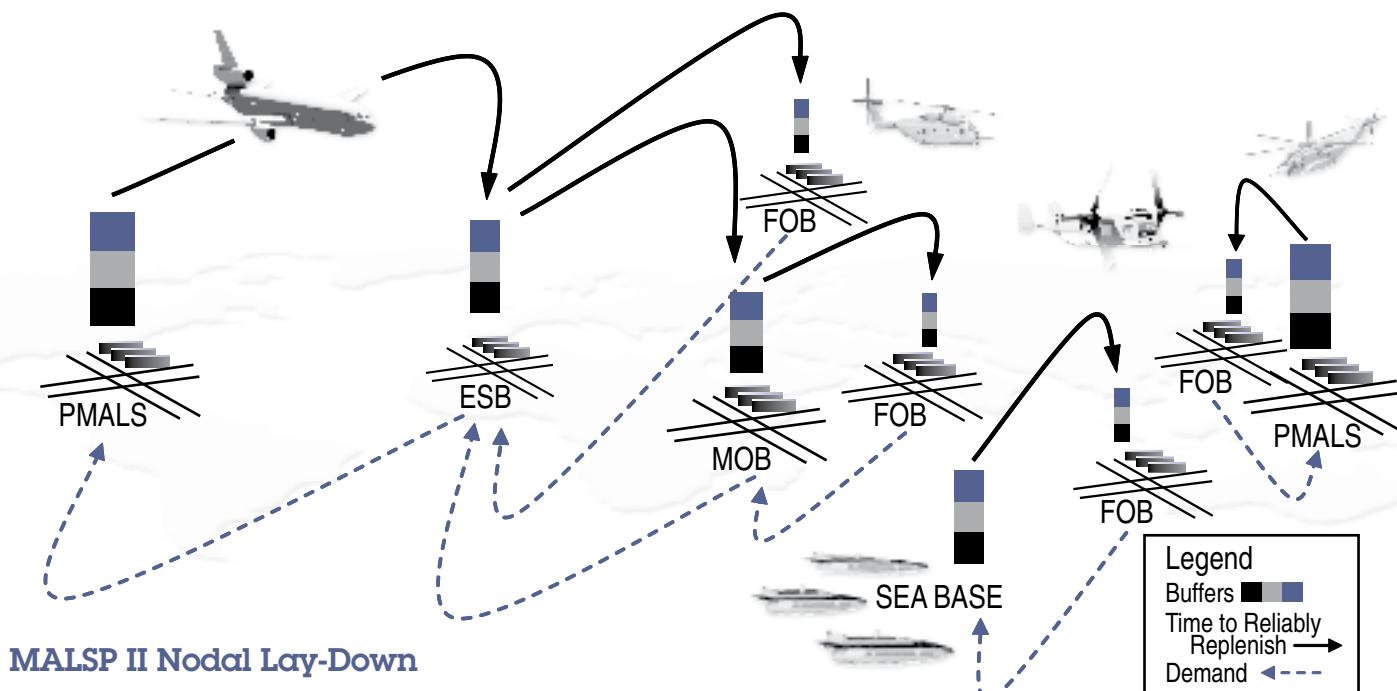
Steward retired from the Marine Corps in 2006 after serving in various aviation logistics functions and is currently employed as the MALSP II deputy project manager.

theater was insufficient for handling the amount of materiel deployed for the operation." The report concluded that "lessons learned from Operation Desert Shield and Storm and other military operations have not been effectively applied." The report also contains several disturbing photographs of problematic distribution depots and bottlenecked supply hubs.

The "To-Be" Design

MALSP II employs an evolutionary strategy to bridge capability gaps that exist between the as-is and to-be designs. At the foundation of this bridge to the future is a force-centric logistics chain built on enterprise AIRSpeed

The new design, MALSP II, is a "pull" system tied to market demand. The design includes improved support packages and a system of buffers that cushion against demand spikes and variability. Support packages are deployed to provide support until sustainable buffers are established. The new packages will be aircraft/unit/mission-scalable and highly mobile. Buffers are sized around times to reliably replenish and around demand patterns, and buffers are placed where they best exploit the system's constraint. The overall design is centered on development and maintenance of buffers that are co-located with the customer. In addition, the packages will provide for a seamless transition to buffers, and buffers will allow for



(Theory of Constraints, Lean, and Six Sigma) methodologies. AIRSpeed is the Navy and Marine Corps' terminology for continuous process improvement.

A logistics chain differs from a traditional supply chain in that it includes intermediate-level "on-aircraft" maintenance and support functions. Bridging capability gaps also ensures that a logistics chain is also:

- Horizontally and vertically integrated from end-to-end
- Focused on material management, maintenance, transportation, information systems, and planning
- Enabled by continuous process improvement, technology insertion, business process re-engineering, and weapons systems current readiness
- Integrated with the Defense Transportation System, Global Information Grid, common operating picture, and acquisition reform
- Compatible with autonomic logistics, sense and respond logistics, and associated technologies.

concurrent reconstitution of packages during the transition phase. This reconstitution capability will allow for rapid redeployment/reassignment of packages if required. Buffers in the logistics chain are assigned to nodes, each with its own value stream, and arranged in a system called a "nodal lay-down," as illustrated in the MALSP II Nodal Lay-Down figure. In a nodal lay-down, each upstream "parent" node buffers a downstream "child" node as demands are placed on the system. For example, when a part is issued to the flight line, the resulting transaction creates a signal that triggers a series of replenishments downstream until each hole at each node is filled. Assuming the part is repairable, a reverse demand for the retrograde will occur simultaneously. In certain cases, parts bypass nodes as they travel up and down the logistics chain. From fighting hole, nodes in the lay-down are:

- **Parent Marine Aviation Logistics Squadron (PMALS).** The PMALS contains supply and repair capability buf-

fers and is directly linked to wholesale supply, depots, and original equipment manufacturers. Most PMALS are located in the continental United States. The PMALS is responsible for the logistics support of all downstream child nodes. In some operational scenarios, it is possible to have more than one PMALS supporting the same nodal stream.

- **En-route Support Base (ESB).** The ESB is a supply-buffered distribution hub that links the PMALS with supported downstream main and forward operating bases. The ESB takes full advantage of commercial air carriers and existing hubs to exploit the system's constraint. ESBs have no local demand and can be located in the continental United States or overseas.
- **Main Operating Base (MOB).** The MOB hosts a supply buffer that supports local demand as well as buffers at forward operating bases and forward armament and refueling points. MOBs also support the last tactical mile of transportation.
- **Forward Operating Base (FOB).** The FOB is at the tip of the bayonet and may be supported via MOB or directly from an ESB. The FOB hosts a supply buffer that supports local demand.

From the ESB forward, it may become necessary to provide repair capability; however, in an effort to minimize forward footprint, intermediate-level repair should be limited to the PMALS whenever and wherever possible. In addition, some lay-down scenarios involve sea bases consisting of Maritime Prepositioning Force squadrons and roll-on/roll-off cargo container ships and their future replacements; however, specific roles of these sea nodes in a MALSP II design wait to be defined.

MALSP II is enabled by an enterprise technology architecture that automates routine decision making, analysis, and business processes in the logistics chain. This technology will provide accurate and timely material information that is horizontally and vertically transparent, and visibility of static and in-transit material from the point of manufacture/repair to the point of consumption, to include retrograde disposition. The Expeditionary Pack-Up Kit is one tool being developed specifically for the new logistics chain. EPUK will give each buffer manager the ability to scan parts as they are received, sent, and stowed so that the resulting transactions can be transmitted back to the PMALS in near-real time, thereby removing the administration burden from the battlefield. Other technology solutions in development or being investigated are:

- **An expeditionary buffer management tool**—provides command and control of the logistics chain by interfacing with EPUK and identifying disruptions in

the flow of materiel so that the appropriate corrective action can be applied.

- **Radio Frequency Identification**—provides a means to track in-transit containers.
- **Mesh networking**—provides individual nodes with total asset visibility and allows for quick gain or transfer of packages and buffer inventories.
- **Logistics planning/decision tools**—assist in buffer sizing/shaping and node selection and placement based on a given operational scenario.

This blend of technology will ultimately deliver a logistics chain that supports multiple operation types and responds rapidly to changes in demand.

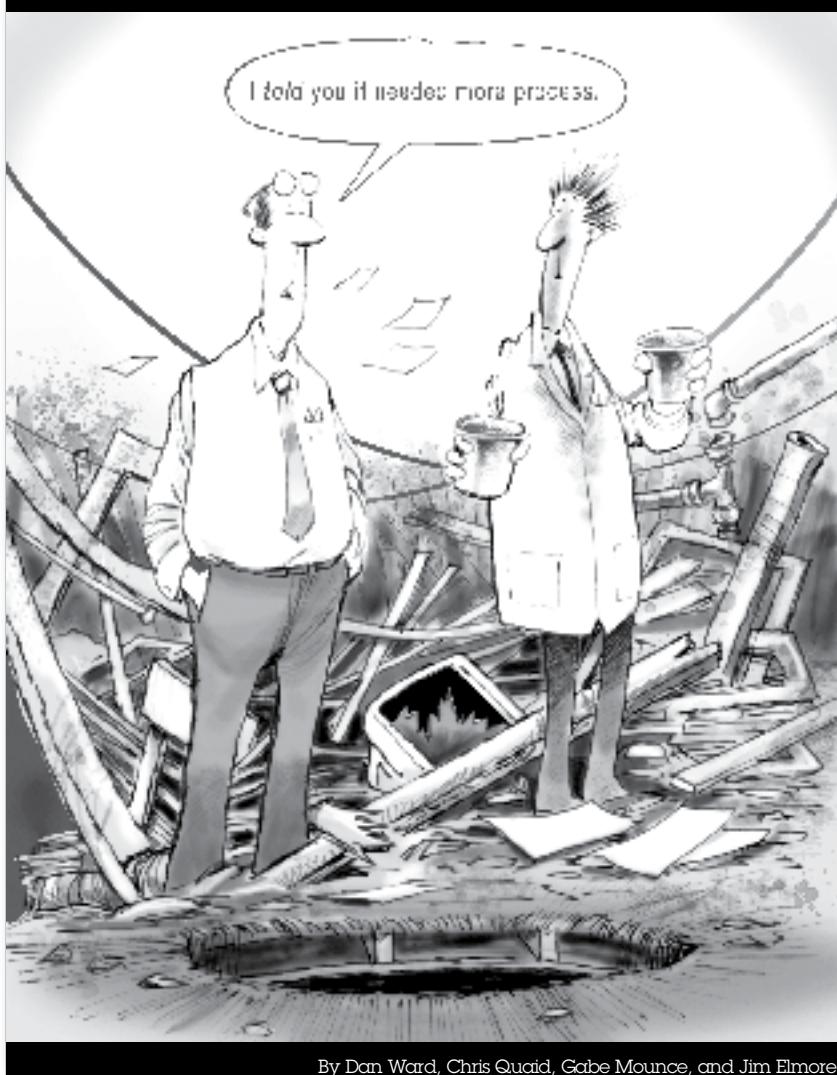
Beyond Bumper Stickers and Buzzwords

Fleet-wide acceptance of MALSP II concepts will require sweeping changes in organizational culture and behavior. AIRSpeed training has and will continue to shift the paradigm.

It is difficult to convince organizations that their current methods are flawed. After all, didn't the current system work in the past? The harsh reality is that what worked in the past relied on workarounds, expediting, and other heroics that exist in a failed system. AIRSpeed and MALSP II are not "change for the sake of change;" their concepts are based on hard science and future operational plans and concepts of operation. In addition to AIRSpeed training, an aggressive campaign has begun to educate Marine aviation logisticians in MALSP II doctrine.

In 2005, a multi-phased pilot was launched to prove MALSP II concepts. Between February and August 2006, the pilot identified 273 consumable NIINs [*national item identification numbers*] that degraded aircraft readiness at a FOB in Iraq. After applying AIRSpeed methodologies to this same population of NIINs, there was only one mission-degrading requisition not filled in Iraq between February and August 2007. The pilot will be used to develop and accomplish the following MALSP II initial operational capability (IOC) mission-essential tasks: developing logistics chains and selecting node locations; developing buffers in a time domain; deploying maintenance capability in a logistics chain (when necessary); moving materiel and requisitions in a logistics chain; sustainment and continuous process improvement; determining a basic initial package for deployment; and redeployment planning that will allow organizations to align their resources and policies to MALSP II.

These mission-essential tasks are linked to measures of effectiveness and suitability and critical technical parameters. A near-term pilot task includes developing repair-



By Dan Ward, Chris Quaid, Gabe Mounce, and Jim Elmore

able buffering procedures by integrating a FOB in the Horn of Africa, leveraging on upcoming exercises with modeling and simulation, and acquiring/fielding buffer management capability. Proving value through use of the pilot in this manner is critical to the overall development and buy-in of MALSP II concepts.

The Aviation Logistics Transition Task Force is the umbrella under which stakeholders, subject matter experts, planners, and others as required are organized to serve in working groups and integrated product teams to identify capability gaps and implement MALSP II concepts. Reviews are conducted at defined intervals throughout the development and implementation process to identify needed revisions and to allow for timely improvements in these strategies to meet performance requirements. A MALSP II strategic roadmap was developed using a project network to identify a goal, objectives, tasks, deliverables, and success criteria. While IOC is framed by the same seven mission-essential tasks assigned to the pilot, the full operational capability portion of MALSP II consists largely

of reorganization/restructuring and consolidation requirements resulting from the impact of IOC. Factors such as available project resources and alignment with the Marine Corps Expeditionary Force Development System also played a role in the FOC selection process. Some FOC mission-essential tasks identified in the strategic roadmap are:

- Operating from a sea base, e.g., Maritime Prepositioning Force and Maritime Prepositioning Force (Future)
- Aligning with future operational concepts
- Globally managing MALSP elements in buffers/time domain (e.g., people, parts, support equipment, mobile facilities, and maintenance capabilities)
- Achieving a common logistics operating picture
- Aligning resources and changing policies.

Realizing the MALSP II dream will ultimately require a rigorous effort to develop and implement new business rules, transformation methodologies, measures of effectiveness, and technology enablers with an overall emphasis on designing for increased performance and reduced footprint.

Tomorrow's Fight Today

In keeping with continuous process improvement and an evolutionary strategy, MALSP II development will include planning phases for the third release of MALSP. By proactively adding the "hooks" that accommodate emerging logistics capabilities and technologies, MALSP II will be poised for a seamless transition to a follow-on design. The third design is likely to reflect an increased emphasis on distributive and adaptive operations in a net-centric warfare environment. This kind of system dynamically positions inventory and uses transportation flexibility and robust technology to handle uncertainty. Autonomic logistics and sense-and-respond technologies will lend themselves well to this design by prepositioning the right parts, people and equipment at the right time. This proactive system may not totally eliminate the need for buffers; however, any remaining buffers are likely to be smaller in both depth and range. Ultimately, by replacing mass with velocity in this manner, we will improve overall logistics effectiveness and aviation weapon systems performance.

The author welcomes comments and questions and can be contacted at douglas.steward@navy.mil.